

CHAPTER 1

INTRODUCTION TO THE WILDLIFE STRIKE PROBLEM

Throughout history, humans have been intrigued and inspired by the beauty of birds and their ability to fly. Birds first took to the air about 150 million years ago. Humans began to share airspace with birds only 100 years ago. Unfortunately, when aircraft and birds attempt to use the same airspace at the same time, collisions occur. Birds are not the only wildlife problem for aircraft. Deer, coyotes, and even alligators wandering onto runways can create serious problems for departing and landing aircraft. Aircraft collisions with wildlife, also commonly referred to as wildlife strikes, annually cost the United States civil aviation industry over \$300 million in direct damage and associated cost, and over 500,000 hours of aircraft down time. Although the economic costs of wildlife strikes are extreme, the cost in human lives lost, greater than 100 in the USA since 1960, best illustrates the need for management of the wildlife strike problem. This handbook is designed to inform airport personnel about the scope of the wildlife strike problem and to serve as a ready reference regarding legal authority, regulations and the development, implementation and evaluation of Wildlife Hazard Management Plans for airports.



A flock of 300 European starlings competes for airspace with a MD-80 aircraft during landing approach at an airport in New York, 1998. (Photo by R. A. Dolbeer, USDA)

The wildlife strike problem is not new. Five years after his first flight in 1903, Orville Wright reported striking a bird while flying near Dayton, Ohio. On 3 April 1912 Calbraith Rogers, the first person to fly across the continental USA, became the first fatality as a result of a bird strike. Since those first wildlife strikes, aircraft designs have changed radically and wildlife populations and air traffic have increased. As a result, at least 78 civil aircraft and 201 civilian lives have been lost worldwide due to wildlife strikes since



Calbraith Rogers and the wreckage of his plane, the "Vin Fizz." Rogers, the first man to fly across the United States, was also the first to die as a result of a bird strike. (Photo courtesy National Air and Space Museum, Smithsonian Institution, SI Neg. No. A-43520-E)

1960. Since 1960, at least 250 military aircraft and 120 military personnel have been lost because of wildlife strikes.

The onset of the jet age revolutionized air travel, but magnified the wildlife strike problem. Early piston-powered aircraft were noisy and relatively slow. Wildlife could usually avoid these aircraft, and strikes that did occur typically resulted in little or no damage. However, modern jet aircraft are fast, relatively quiet, and their engine fan blades are often more vulnerable than propellers to wildlife strike damage. When jets collide with

birds or other wildlife, serious structural damage and engine failure can occur. Multiple-engine damage from the ingestion of flocks of birds is of particular concern as the fleet of 2-engine passenger aircraft increases in the USA. In 1969, 75% of the 2,100 passenger aircraft had 3 or 4 engines. By 1998, the fleet had grown to 5,400 primarily turbine-powered aircraft of which only 30% had 3 or 4 engines. By 2008, the fleet will consist of about 7,000 aircraft and less than 10% will have 3 or 4 engines.

Air travel has become commonplace in the United States. Aircraft have also assumed a vital role in tactical and logistical military operations. These factors have resulted in increased air traffic. For example, commercial air movements in the United States increased about 3% per year, 1985-1997. Coincidentally, human use of the skies has increased during an extremely successful period of wildlife management in North America. Aggressive natural resource programs by public and private wildlife management groups have contributed to impressive increases in populations of many species such as alligators, cranes, deer, geese, gulls, herons, pelicans, raptors (falcons, hawks, eagles, and owls), and vultures. At the same time, Canada geese, coyotes, deer, and other wildlife have expanded into suburban and urban areas, including airports, and are thriving in response to changes to habitats in these areas. These concurrent increases in air traffic and wildlife populations contribute to an increased probability of wildlife strikes. These two factors, combined with the increased speed, quietness and vulnerability of modern aircraft, interact to form the basis of the wildlife strike problem that airport managers face. As a final factor, airport managers also face increased concerns about airport liability in the aftermath of damaging wildlife strikes.



In the 1960s, 4-engine aircraft such as the Lockheed Constellation (top) comprised 75% of the U.S. fleet of passenger aircraft. By 2008, an estimated 90% of the fleet will be 2-engine aircraft, such as the Boeing-777 (bottom). (Constellation photo by Bob Shane, Constellation Group; Boeing-777 photo by Dino)

Wildlife strike problems at individual airports result from these above-described factors interacting at the local scale. The nature and magnitude of the problem an individual airport faces will depend on many factors, including air traffic type and volume, local and migratory wildlife populations, and local wildlife habitat conditions. Wildlife are attracted to an airport environment because desirable food, water or habitat is present. The majority of wildlife strikes occur within the immediate airport environment: 78% of all strikes occur under 1,000 feet above ground level (AGL). Of these, 35% occur during takeoff and climb, and 49% occur during approach and landing roll. Therefore, most wildlife involved in strikes are using the airport or its immediate vicinity, and the most logical place to begin correcting the problem is on and near the airport.

Airport sponsors and managers have a legal responsibility to ensure that the airport maintains a safe operating environment. As part of this responsibility, they must first assess the risk and magnitude

of the wildlife strike problem for their airport. This assessment must include a review of all strike incidents, assessment of wildlife using the airport environment and assessment of wildlife habitat available to wildlife on the airport. Based on airport conditions and assessed strike risk, airport personnel may need to devise a Wildlife Hazard Management Plan for reducing strike risk and occurrence. Airport personnel must then act to implement and periodically evaluate the plan.

This manual contains a compilation of information to assist airport personnel in the development, implementation, and evaluation of Wildlife Hazard Management Plans at airports. The manual includes specific information on the nature of wildlife strikes, legal authority, regulations, wildlife management techniques, wildlife hazard assessments, wildlife hazard management plans and sources of help and information. It is emphasized that this manual provides only a starting point for addressing wildlife hazard

issues at airports. Wildlife management is a complex discipline and conditions vary widely across the United States. Therefore, the development of Wildlife Hazard Management Plans and the implementation of management actions by airport personnel should be under consultation by qualified wildlife biologists trained in wildlife damage control.